

THE LARVAE OF AUSTRALIAN CYBISTER spp. Curt., HOMOEODYTES
spp. Reg. AND HYDERODES SHUCKARDI Hope.
(COLEOPTERA : DYTISCIDAE.)

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SUMMARY

The larval stages of *Cybister tripunctatus* (Oliv.), *C. godeffroyi* Weh., *Homoeodytes atratus* (Fab.) and *Hyderodes shuckardi* Hope are described. The larvae of *Homoeodytes scutellaris* (Germ.) are redescribed in greater detail than in the original description.

Descriptions of all instars except the first of *H. atratus* are included.

During a recent trip through Eastern and Northern Australia, I collected several large Dytiscid larvae belonging to the Cybisterini. Among them were two specimens of a *Homoeodytes* Reg. other than *H. scutellaris* (Germ.) the larva of which is known (Watts, 1963). As *H. atratus* (Fab.) is the only other species of this genus in Australia and an adult specimen was taken at the same time as the larvae, it seems certain that these larvae belong to *H. atratus*. The collection also contained larvae of two species of *Cybister* Curt., one of which, *C. tripunctatus* (Oliv.) was identified by breeding out the adult. Larvae of the other species have been assigned to *C. godeffroyi* Weh., the only other *Cybister*, other than the following, recorded from Australia. Blackburn, in 1888, described a *Cybister* under the name of *C. granulatus*. I have seen the co-type and specimens identified by Blackburn in the S.A. Museum and consider that they represent the more granulated forms of *C. tripunctatus*, there being an unbroken gradient from smooth to rough elytra in this species. In addition, the larvae in question are much larger than those of *C. tripunctatus* which is the same size as *C. granulatus*.

Xamheu (1904) described a larva from Madagascar under the name of *C. tripunctatus*. The description of the colour does not match that of Australian specimens and the fact that the size of the larva he described was a great deal larger than the true *C. tripunctatus* (length 80 mm as against 57 mm) indicates that he was mistaken in assigning his larva (which he did not rear) to this species.

In September, 1962, I visited a pool in a slowly flowing creek at Williamstown, S.A., and found it to contain a large number of Dytiscini larvae. Several of the larger larvae were bred out and proved, as expected, to belong to *Hyderodes shuckardi*† Hope. A month later I made a trip to the same pool in an attempt to collect adults. However, no specimens of any stage were found. As it was hardly likely that all the larvae present one month earlier had pupated, many being first instars, it seems likely that the whole population had been

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† Dr. H. Bertrand has pointed out to me the existence of a previous description of the 3rd instar of *H. shuckardi* cf. Bertrand, 1932.

destroyed in the meantime. Further trips also produced no specimens, nor had I taken the species there on numerous previous occasions stretching back over two years.

This paper contains descriptions of the larvae of the above four species as well as a redescription of those of *H. scutellaris* made desirable by the discovery of the larvae of closely related species. *Hyderodes* Hope is endemic to Australia; *H. shuckardi* is found in S.E. Australia, Tasmania (Sharp, 1882) and S.W. Australia (Regimbart, 1908), although the latter reference might in reality be to *H. crassus* Sharp. Two other species, *H. crassus* and *H. collaris* Sharp, have been described from N.W. Australia, but are very rare in collections. *C. godeffroyi* occurs in the wetter areas of N. Australia; *C. tripunctatus* occurs through most of Australia apart from the more southern areas, having outside Australia a wide distribution through S.E. Asia, India, Africa and occasionally S. Europe. *H. scutellaris* is common in southern Australia including Tasmania; *H. atratus* is more tropical in distribution, occurring in the coastal regions of Queensland and northern Australia. The only other species of the genus *H. hookeri* (Wh.) occurs, together with the introduced *H. scutellaris*, in New Zealand.

In identifying the larvae of *Cybister* and *Homoeodytes* it is helpful to know the instars of the specimens involved. A good clue to this is the relative lengths of the third and fourth joints of the labial palpi: in the 3rd instar the fourth joint is the smaller, in the 2nd instar it is either a little longer or roughly equal to the third joint, and in the 1st instar the fourth is the greater. Furthermore, 1st instar larvae can be separated from older instars by the lack of a row of setae behind the ocular area and also by the lack of ventral spines on the posterior abdominal segments present in older instars, although often few in 2nd instar larvae.

In my key to the larvae of Australian Dytiscids (Watts, 1963) *Hyderodes* is not included. It will run to *Hydaticus* Leach from which it can be distinguished by the lack of a ligula and the presence of swimming hairs on the cerci.

Cybister tripunctatus (Oliv.)

3rd Instar Larvae

Chitinous areas testaceous, spotted with black, tips of antennae darker. Terga with H-shaped darker markings one on either side of the middle. Dorsal membranous areas with small blotches of dark grey. Underside pale grey, in some specimens dotted with dark grey, especially on more posterior segments. Pale medial stripes down dorsal surface of abdomen present in some specimens. This colour pattern is not well developed in all specimens.

Head nearly as wide as long with a well-marked neck region, dorsal sutures straight, meeting just in front of centre. Front of clypeus trilobed: the two lateral lobes wide with outer edges slightly convex especially near the sides,

Line indicates .1 mm. (1) Head of 2nd instar *Homoeodytes scutellaris*. (2) Ditto, *H. atratus*. (3) Ditto, *Hyderodes shuckardi*. (4) Clypeus, 1st instar *Cybister godeffroyi*. (5) Ditto, 1st form of 2nd instar. (6) Ditto, 2nd form. (7) Ditto, 3rd instar. (8) Clypeus, 1st instar *C. tripunctatus*. (9) Ditto, 2nd instar. (10) Ditto, 3rd instar. (11) Clypeus, 2nd instar *H. atratus*. (12) Tip of last abdominal segment 2nd instar, *H. scutellaris* (ventral). (13) Ditto, *C. tripunctatus*. (14) Dorsal view last abdominal segment, *Hyderodes shuckardi* (swimming hairs omitted). (15) Tarsal claw of fore leg of 3rd instar, *H. shuckardi*. (16) Labium, 3rd instar, *H. shuckardi*. (17) Antenna, 3rd instar, *H. shuckardi*. (18) *H. shuckardi*, maxilla. (19) Mandible, 3rd instar, *C. tripunctatus*. (20) Ditto, *H. scutellaris*.

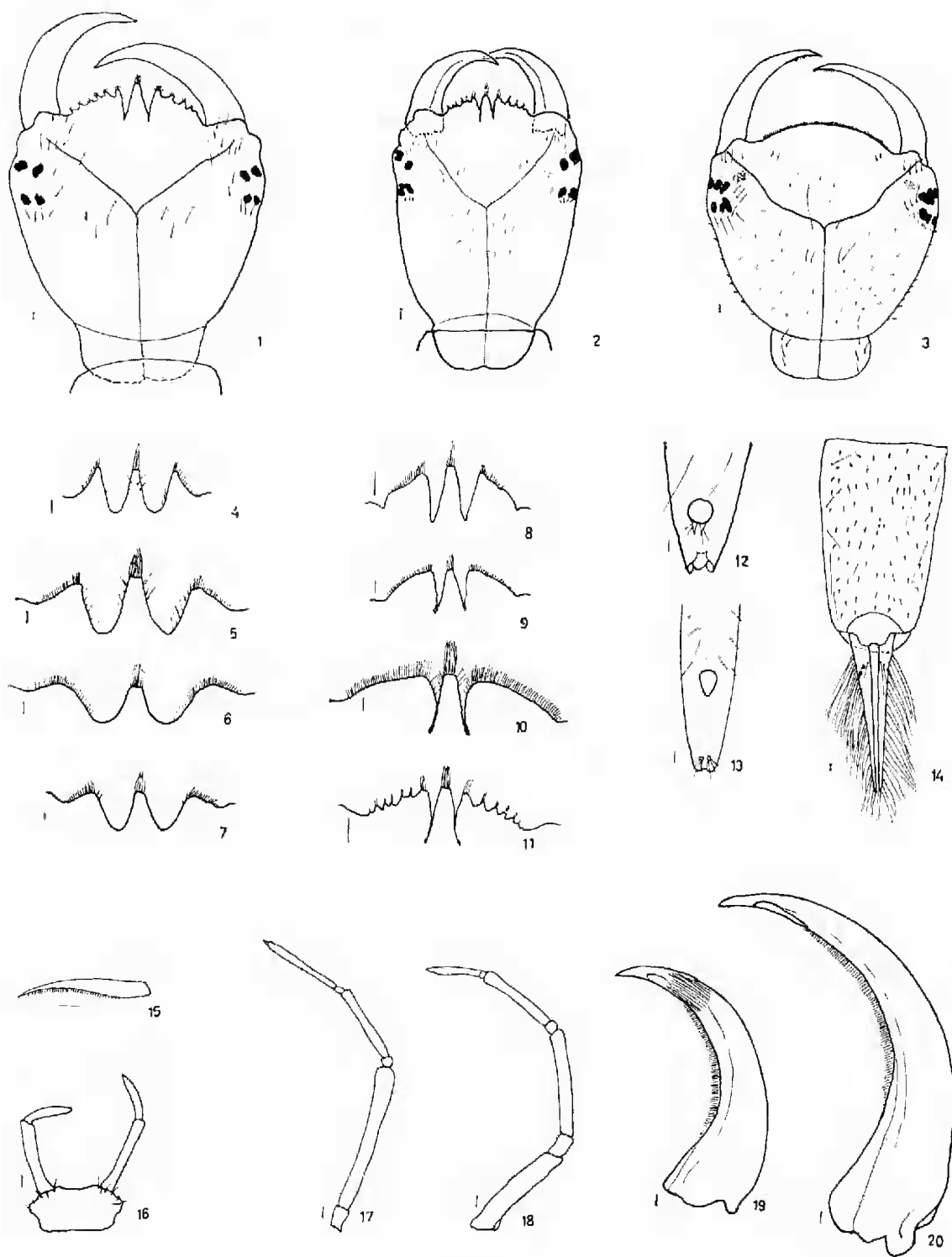


PLATE 1

inner edges convex and for the most part touching the sides of the middle lobe which is in the form of a narrow triangle, truncate at the top, which projects slightly in front of the lateral lobes. The front edges of these and the top of the middle lobe are fringed with short setae, those of the middle lobe nearly twice the length of the others. There are a few stouter setae along the front of the inner edges of the lateral lobes where they do not touch the middle lobe.

Mandibles rather stout, outer and inner edges evenly curved, top quarter dark and devoid of setae. Just below this mandible girdled with dense long setae which cover a good half of apical quarter. There is a rather thick row of small setae along the inner edge of the middle two quarters of the mandible. Rest of mandible bare.

Antennae, maxillae and labial palpi as in Figs. 47, 23, 35.

Labrum strongly bilobed, front much wider than back and with a small but prominent ligula.

Prothorax 2.3 times the length of the mesothorax which is a little longer than the metathorax.

Abdominal segments 7 and 8 with swimming hairs. Segment 8 narrowing towards apex, its ventral surface with scattered long setae and numerous short spines loosely grouped around the base. Segment 7 parallel-sided and about half the length of the 8th, its ventral surface with many very short spines and a few long setae. Circi reduced to small lobes, each with four long setae and placed close to the tip of the segment.

Legs with two rows of long swimming hairs on posterior face; claws simple, very nearly equal in length, the inner one a fraction shorter.

Length 51-57 mm, head capsule 5.3-5.6 mm L., 4.3-4.6 mm W.

2nd Instar Larvae

Colour as in 3rd instar, but dorsal colour pattern less distinct and in some non-existent.

Front of head wider than back with well marked neck region; clypeus as in 3rd instar but with wedge-shaped notches between middle and lateral lobes with acute angles of about 20 degrees. Middle and lateral lobes only touch for a short distance at the bottom of the notches, or, as in a few specimens are completely separate in which case the bottoms of the notches curve slightly outwards. Front of middle lobe only slightly in front of foremost parts of lateral lobes. The few stout setae on the inner edges of the lateral lobes are placed further back than in the 3rd instar.

Mandibles, labrum and ligula as in 3rd instar.

Antennae, maxillae and labial palpi as in figures. There is a variation in the relative lengths of some joints between different specimens but these differences are not great.

Prothorax 2.6 times as long as the mesothorax which is slightly longer than the metathorax.

Abdominal segments and legs as in 3rd instar.

Length, 31-34 mm, head capsule, 3.3-3.4 mm L., 2.5-2.6 mm W.

1st Instar Larvae

Very pale with little or no colour pattern.

Head much narrower at back than front. Lobes of clypeus project further forward than in older instars, notches between lobes slightly wider than in 2nd instar, lateral and middle lobes do not touch. Setae along the outer edge of lateral lobes stouter and sparser than in older instars. Front of middle lobe only a little in front of foremost parts of the lateral lobes.

Top quarter of mandible curved inwards more sharply than rest.

Antennae, maxillae and labial palpi as in Figs. 45, 21, 33.

Labrum and ligula as in older instars.

Prothorax twice the length of the mesothorax, which is about the same length as the metathorax.

Abdominal segment 7 narrow, segment 8 narrow and parallel-sided for most of its length. Both segments lack the ventral spines of older instars.

Legs relatively longer than in older instars and with swimming hairs not as well developed, claws equal.

Length, 19-22 mm, head capsule, 2.0-2.3 mm L., 1.5-1.6 mm W.

Larvae collected from a temporary billabong, Home Hill, Q., April, 1963; a grassy temporary pool, Malanda, Q., April, 1963; a swamp, Townsville, Q., April, 1963; a temporary pool, Darwin, N.T., May, 1963.

Cybister godeffroyi Weh.*3rd Instar Larvae*

Chitinous parts testaceous, top quarter of mandibles black, membranous areas paler, conspicuous pale stripe down centre of dorsal surface behind head bordered with dark stripes on pro meso and metanotum and terga, dark lines on terga double in some cases. Body covered to varying degrees with small rings of darker colour. Underside paler. Antero-lateral angles of head marginally black in one specimen.

Head a little longer than wide with well marked neck region, dorsal sutures straight, meeting just forward of centre.

Mandibles as in *C. tripunctatus* but with top quarter curving inwards to a slightly greater degree than the rest of the mandible. Front of clypeus trilobed, two lateral lobes with short, slightly convex outer edges and longer, very slightly concave inner edges. Middle lobe narrowly triangular and separated from lateral lobes by wide V-shaped notches rounded at the bottoms. Posterior edges of all three lobes in line. Outer edges of lateral lobes and truncate top of middle lobe with thick stout setae, those of the middle lobe about twice the length of the others. There are a few setae on the inner edges of the lateral lobes.

Antennae, maxillae and labial palpi as in Figs. 50, 32, 26.

Labrum strongly bilobed, front much wider than back and with a small but prominent ligula.

Prothorax about twice the length of the mesothorax which is about the same length as the metathorax. Anterior half of prothorax parallel-sided, posterior half widening towards back.

Abdominal segments 7 and 8 with swimming hairs. Segment 8 narrow, parallel-sided for most of its length but narrowing at tip, its ventral surface with scattered long setae and short spines which are restricted to the basal portion. Segment 7 widest at anterior end and about two-thirds the length of the 8th, its ventral surface with scattered stout spines and long setae. Circi squarish, very small, each with four long setae and placed close to the tip of the last segment.

Legs relatively short, with swimming hairs; claws simple and of a very nearly equal length—the posterior claws of front tarsi a little shorter than anterior ones.

Length, 72-85 mm, head capsule 7.8 mm L., 6.1-7.0 mm W.

The second of my two specimens has the lateral lobes of the clypeus more rounded and the base of the middle lobe wider than the one described above, giving a shallower and more rounded outline to the notches. The setae on the anterior edges of the lateral lobes continue down the inner edges gradually becoming sparser towards the base of the notch.

2nd Instar Larvae.

Colour as in 3rd instar, but with pattern less distinct.

Head as in 3rd instar, mandibles with the tip more noticeably narrower than the rest. Clypeus with lateral lobes triangular, their bases about twice the width of the base of the middle lobe, each lobe with a truncate tip which bears a dense tuft of setae. Setae on middle lobe twice the length of those on the others. Outer edges of lateral lobes with a relatively sparse row of setae, their inner edges with a few setae. Notches between lobes rounded at bottom.

Antennae, maxillae and labial palpi as in Figs. 49, 31, 25.

Labrum and ligula as in 3rd instar.

Prothorax shaped as in 3rd instar, about twice the length of the mesothorax which is a little longer than the metathorax.

Segment 7 of the abdomen a little over half the length of segment 8. Ventral surfaces of these segments with numerous long setae but few, if any, spines.

Legs as in 3rd instar.

Length, 42 mm L., head capsule, 5.0 mm L., 3.7 mm W. (from one specimen only).

Again the clypeus of my two specimens differ, the second form has the clypeus similar to the second form of the 3rd instar.

1st Instar Larvae

Head more elongate. Mandibles with top quarter more strongly curved inwards and much narrower than rest and with inner edge of central portion

Line indicates .1 mm. (21) Maxilla, 1st instar *Cybister tripunctatus*. (22) Ditto, 2nd instar. (23) Ditto, 3rd instar. (24) Labial palpus, 1st instar *C. godeffroyi*. (25) Ditto, 2nd instar. (26) Ditto, 3rd instar. (27) Maxilla, 1st instar *H. scutellaris*. (28) Ditto, 2nd instar. (29) Ditto, 3rd instar. (30) Maxilla, 1st instar *C. godeffroyi*. (31) Ditto, 2nd instar. (32) Ditto, 3rd instar. (33) Labial palpus, 1st instar *C. tripunctatus*. (34) Ditto, 2nd instar. (35) Ditto, 3rd instar. (36) Labial palpus, 2nd instar *H. atratus*. (37) Antenna, 1st instar *H. scutellaris*. (38) Ditto, 2nd instar. (39) Ditto, 3rd instar. (40) Labial palpus, 1st instar *H. scutellaris*. (41) Ditto, 2nd instar. (42) Ditto, 3rd instar. (43) Antenna, 2nd instar *H. atratus*. (44) Ditto, maxilla. (45) Antenna, 1st instar *C. tripunctatus*. (46) Ditto, 2nd instar. (47) Ditto, 3rd instar. (48) Antenna, 1st instar *C. godeffroyi*. (49) Ditto, 2nd instar. (50) Ditto, 3rd instar.

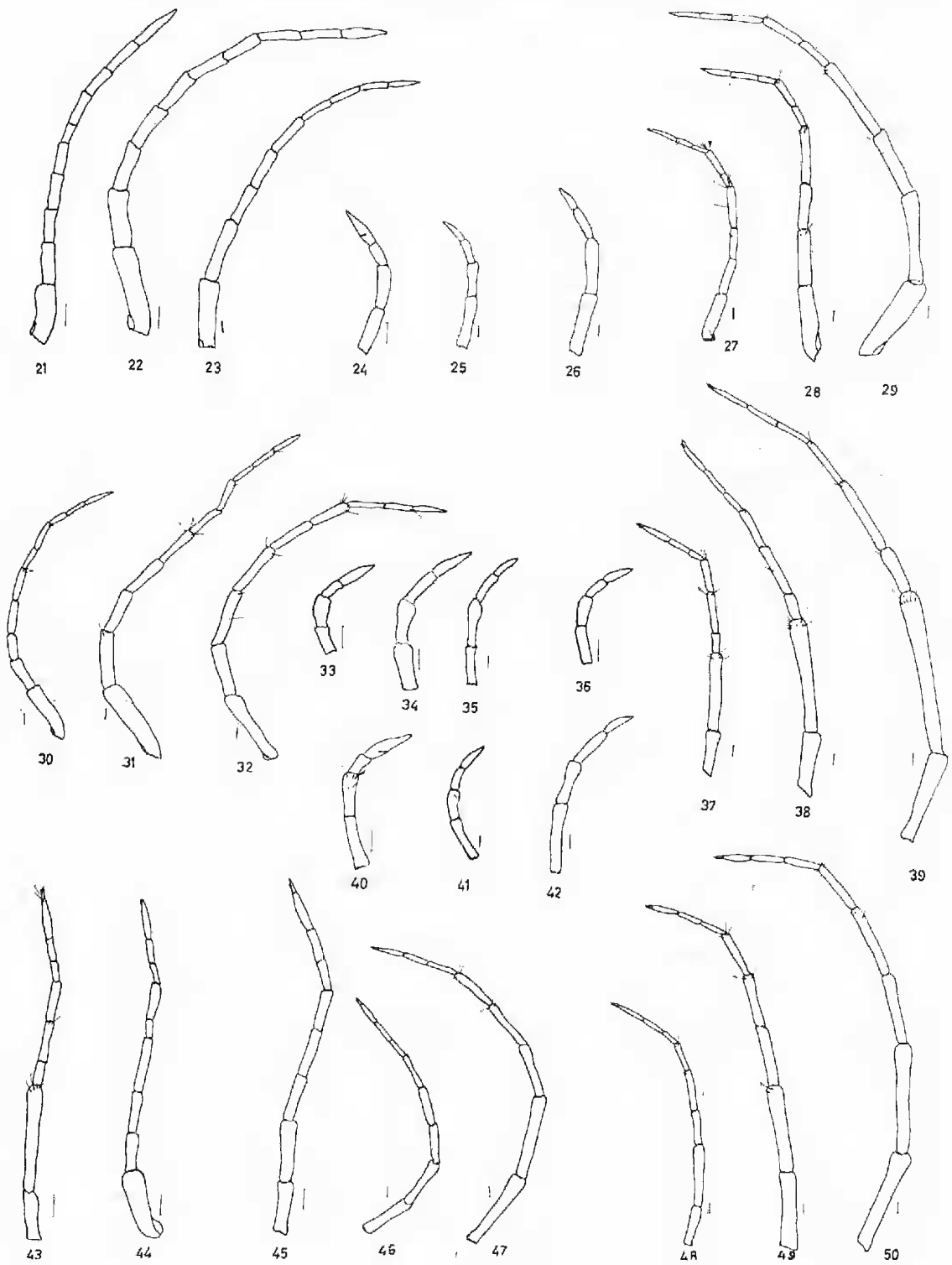


PLATE 2

a little sinuate. Clypeus with all lobes triangular, lateral lobes wider than central lobe and with their inner edges much longer than their outer. Fronts of all lobes truncate and bearing thick tufts of setae, those on the central lobe about twice the length of the others. Outer edges of lateral lobes with a sparse row of setae, inner edges with a few small fine setae.

Antennae, maxillae and labial palpi as in Figs. 48, 30, 24.

Labrum and ligula as in older instars.

Prothorax shaped as in older instars, twice the length of the mesothorax which is a little longer than the metathorax.

Abdominal segment 8 about twice the length of segment 7, both lacking ventral spines. Cerci as in older instars.

Legs relatively longer than in older instars and with sparser swimming hairs.

Length, 29 mm, head capsule 2.5-2.6 mm L., 2.3-2.4 mm W.

Larvae (two 3rd, two 2nd and several 1st instars) collected from swamps at Home Hill and Townsville, Q., April, 1963.

Larvae of this species are best separated from those of *C. tripunctatus* by their larger size and the different shape of the clypeus after having first determined the instars by means of characters mentioned in the introduction.

Homoeodytes Reg.

The dentate lateral lobes of the clypeus effectively separate *Homoeodytes* from the Australian *Cybister*. However, Bertrand (1922) has illustrated a supposedly *Cybister* larva from Madagascar that has the lateral lobes slightly dentate, but not to the same extent as in *Homoeodytes*. The cerci are not as reduced, although those of *H. atratus* approach those of *Cybister* and they are placed much farther forward than in *Cybister*. The neck is short and is sunk into the prothorax, whereas in *Cybister* it is longer and is not covered by the prothorax. The mandibles lack the apical girdle of setae found in *Cybister*. (In a previous paper (Watts, 1963) before I had seen specimens of *Cybister* I gave as a distinguishing character the length of the ligula which in fact does not differ much between the genera.)

Redescription of H. scutellaris (Hope).

3rd Instar Larvae

Body grey-brown, head and thorax reddish-brown, black stripes on either side of body, especially noticeable on the thorax.

Head roundish, as long as wide with a short neck region which is covered by prothorax. Dorsal sutures straight and meeting in centre of head. Clypeus trilobed, lateral lobes strongly dentate. Number of teeth variable, from 13 to 18 and often asymmetrically arranged. Lateral lobes well separate from the narrow triangular-shaped middle lobe. Tips of teeth and top of middle lobe with long setae. Mandibles slender and evenly curved with very short setae along inner edge except for basal and apical quarters.

Antennae, maxillae and labial palpi as in Figs. 39, 29, 42.

Labium bilobed, front much wider than back, with a small ligula.

Prothorax 2.6 times the length of the mesothorax, which is about the same length as the metathorax. Anterior half of prothorax parallel-sided, posterior half widening towards back.

Abdominal segments 7 and 8 with swimming hairs, segment 7 with sides roughly parallel, its ventral surface with numerous small spines and some long setae. Segment 8 tapering towards apex and a little less than twice length of segment 7, its ventral surface with scattered long setae and a large number of short spines together with some long fine setae near its base. (The ventral spines are very small and are often missing; however, the integument near their point of attachment is darkly pigmented in a roughly oval shape which serves to indicate the position of the spines and also the longer setae.) Cerci very small, narrowly conical in shape with four setae near their tips and placed a little nearer anus than tip of segment.

Legs with two rows of swimming hairs on posterior face; claws simple, approximately equal in length.

Length 45-55 mm, head capsule 5.0-5.7 mm L., 6.0-6.3 mm W.

2nd Instar Larvae

Colour as in 3rd instar but dorsal pattern much less marked. Head and clypeus as in 3rd instar except that the clypeus has fewer teeth. Mandibles as in 3rd instar, but with apical quarter much narrower than the rest.

Antennae, maxillae and labial palpi as in Figs. 38, 28, 41.

Labium and ligula as in 3rd instar.

Prothorax shaped as in 3rd instar, 3.2 times the length of the mesothorax which is a little longer than the metathorax.

Abdominal segments 7 and 8 as in 3rd instar except that the ventral spines are a little longer.

Legs as in 3rd instar.

Length, 30-34 mm, head capsule 4.1-4.2 mm L., 3.6-3.7 mm W.

1st Instar Larvae

Pale, almost without markings.

Head more triangular in shape than in older instars. Row of prominent setae behind the ocular area present in older instars absent. Mandibles and clypeus as in 2nd instar.

Antennae, maxillae and labial palpi as in Figs. 37, 27, 40.

Prothorax shaped as in older instars, about twice as long as the mesothorax which is about the same length as the metathorax.

Abdominal segments 7 and 8 as in older instars except that they lack ventral spines and have the cerci placed relatively nearer the anus.

Legs, labrum and ligula as in older instars.

Length, 23-24 mm, head capsule 2.3-2.6 mm L., 2.3-2.4 mm W.

Larvae collected from a weedy creek, Canberra, January, 1961; a weedy pool, Melbourne, December, 1961. Lake Boga, Vic., January, 1961; and a swamp, Mannum, S.A., September, 1961.

H. atratus (Fab.)*3rd Instar Larva*

Testaceous; terga and dorsal surface of head and thorax covered with darker dots and small blotches. Rest of dorsal surface with an extensive dark latticework giving it a dark brown appearance. Sides of thorax and abdomen lighter in colour. Ventral surface pale grey.

Head nearly rectangular being only a little narrower at base, neck short and sunk into prothorax. Anterior dorsal sutures slightly curved and meeting straight medial suture a little in front of centre of head. Clypeus trilobed, lateral lobes dentate, each tooth with a tuft of setae at its tip. (The number of teeth in *H. scutellaris* is very variable and the same is probably true of this species, my one specimen of this instar having four on the right lobe and six on the left.) Middle lobe narrowly triangular in shape with lateral lobes touching it along its basal half. Row of large setae behind ocular area. Mandibles stout, top quarter more strongly curved inwards than the rest, central portion of inner edge straight. The mandibles of the specimen are abraded of most setae.

Antennae and maxillary palpi missing. Maxillary stipes long and without galea. Labium moderately bilobed with a small cone-shaped ligula. Labial palpi with last joints missing, relative lengths of others $1 > 2 > 3$.

Prothorax a little less than three times the length of the mesothorax which is a little longer than the metathorax. Anterior half of prothorax narrow and cylindrical, posterior half widening towards middle.

Abdominal segments 7 and 8 with swimming hairs. Segment 7 narrower at back than front and with its ventral surface sparsely covered with small spines and longer setae (see note under *H. scutellaris*). Segment 8 about twice the length of segment 7, tapering towards apex, its ventral surface with scattered long setae, especially along the sides, and numerous small spines near the base. Cerci reduced to small, widely triangular knobs with a few long setae and placed half-way between anus and end of segment.

Legs with two rows of swimming hairs on posterior face; claws simple, approximately equal in length.

Length, 35 mm, head capsule 3.8 mm L., 2.5 mm W.

2nd Instar Larva

Paler than 3rd instar, with dark latticework absent in my one specimen.

Head as in 3rd instar with neck region within prothorax, clypeus with inner edges of lateral lobes touching edges of middle lobe for a little less than half its length. Specimen has seven teeth on left lobe, six on right lobe, with both lobes having two very small teeth, with a few setae, at their lateral edges. Mandibles as in 3rd instar with all but their apical quarter with fine setae along the inner edge.

Antennae, maxillae and labial palpi as in Figs. 43, 44, 36.

Labrum and ligula as in 3rd instar.

Prothorax shaped as in 3rd instar, about twice the length of the mesothorax which is a little longer than metathorax.

Abdominal segment 7 a little more than half the length of segment 8 and more or less parallel-sided; otherwise these two segments as in 3rd instar.

Legs as in 3rd instar.

Length 29 mm, head capsule 2.4 mm L., 1.7 mm W.

1st instar larva as yet unknown.

Two specimens collected from a temporary billabong at Home Hill, Q., April, 1963.

Larvae of this species can be separated from those of *H. scutellaris* by their more reduced cerci, their narrow elongated head and the fact that the lateral lobes of the clypeus touch the middle lobe. There is a possibility that I have assigned these two specimens to the wrong instars: they may prove to be the 1st and 2nd instars.

Hyderodes Hope

This genus is most closely related to *Dytiscus* L. of the Northern Hemisphere, the two forming a well-marked tribe, the larvae characterised by their entire clypeus, cerci and abdominal segments 7 and 8 with swimming hairs, and the lack of a ligula. The larvae of *Hyderodes* differ from those of *Dytiscus* most noticeably in the following characters: *Hyderodes* has temporal spines (except in the 1st instar), spines on the ventral surface of the head, two rows of short spines along the bottom edge of claws and has no row of long setae on the inner edge of the cerci. (In many species of *Dytiscus* the number of setae on the inner edge of the cerci are reduced to only two apical ones in 1st instar larvae.)

H. shuckardi Hope

3rd Instar Larvae

Testaceous, chitinous areas with numerous small black dots, integument greyish without spots.

Head as wide as long, anterior dorsal sutures curved and meeting straight medial suture in front of middle of head. Front of clypeus complete, with a thick row of short blunt setae along front edge. A greatly pigmented area on dorsal surface, twice the size of an ocellus, just inwards from ocular area. Temporal spines present, stout spines on underside of head. Mandibles slender and curved but with middle portion of inner edge rather straight. Sparse row of setae along this straight portion set a little back from edge on dorsal surface and a thick row of very stout setae along inner edge of mandible except for basal quarter. These setae are often abraded to varying degrees.

Antennae, maxillae and labial palpi as in Figs. 17, 18, 16.

Labrum squat, expanded slightly laterally.

Prothorax a little over twice the length of the mesothorax which is slightly longer than the metathorax.

Abdominal segments 7 and 8 with swimming hairs, segment 8 narrower than 7 but only a little longer. Fine setae along sides of all segments, short spines and long fine setae on ventral surface of abdominal segments 4, 5, 6, 7 and 8, spines more numerous and larger on last two. Cerci stout, about length of second last abdominal segment, fringed with long setae on outer edges and with three long setae on dorsal surface close to the base and two long setae on ventral surface close to the tip. Last abdominal segment slightly produced dorsally behind the cerci.

Legs with swimming hairs, claws unequal, posterior one a little shorter, both with two rows of spines on ventral surface.

Length 30-36 mm, head capsule 5.0-5.5 mm L., 4.4-5.0 mm W.

2nd Instar Larvae

As in the 3rd instar except that the prothorax is a little less than twice the length of the mesothorax and the spines on the ventral surface of the abdomen are absent but for a few on the last two segments.

Length 22-26 mm, head capsule 3.7-4.0 mm L., 3.1-3.2 mm W.

1st Instar Larvae

Head quite strongly triangular with neck only slightly marked off and lacking temporal spines. Clypeus as in older instars, mandibles with setae only on apical quarter.

Relative lengths of segments of antennae as follows: $1 > 3 > 2 \gg 4$; of maxillary palpi $2 > 3 = 4 \gg 1$, of labial palpi $1 > 2$ which has a roughened ventral surface.

Prothorax shaped as in 3rd instar, about twice the length of the mesothorax which is about the length of the metathorax.

Claws on legs not or only slightly unequal.

Abdominal segment 8 about 1.3 times the length of segment 7. Cerci a little shorter than last abdominal segment. Ventral surfaces of abdominal segments without spines but with long setae that tend to form transverse bands, last segment with only two setae placed near its apex.

Length 14-16 mm, head capsule 2.2-2.5 mm L., 1.7-2.1 mm W.

Larvae collected from a weedy pool, Williamstown, S.A., September, 1962.

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